Clean Air Mercury Rule Overview, Costs and Benefits

Alexis Cain, USEPA, Region 5
Great Lakes Binational Toxics Strategy Mercury Workgroup
May 17, 2005, Toronto

Clean Air Mercury Rule (CAMR)

- Final rule signed March 15, 2005
- Sets State budgets for mercury emissions from Electricity Generating Units
- Creates national allowance trading program that states can opt into
- Complementary to Clean Air Interstate Rule (CAIR), which controls sulfur dioxide and oxides of nitrogen from EGUs

Clean Air Mercury Rule

- Two phases:
  - 2010--38 ton cap, with emissions reduced by taking advantage of "co-benefits" of reducing sulfur dioxide (SO_2) and nitrogen oxides (NO_x) emissions under CAIR
  - 2018--15 ton cap upon full implementation (69 percent reduction)
  - "banking" of allowances could delay full implementation of reductions, but encourage early reductions from 2010 to 2017
- New coal-fired power plants (construction starting on or after Jan. 30, 2004) must meet new source performance standards AND are subject to caps

CAMR Implementation

- Creates an emission reduction requirement under Clean Air Act section 111(d). Distributes national utility mercury emissions cap among the States and two tribes
- States must submit implementation plans, including regulations, within 18 months of CAMR signature (9/06)
- Can choose model rule, including national emissions allowance trading program modeled on Acid Rain program
- State plans must meet mercury emissions budget; otherwise, have great flexibility. Can set different allowance allocation rules, auction allowances, or allocate fewer allowances, and still participate in national trading program
- Must adopt model trading program provisions to participate in national trading program

Why a Cap-and-Trade Program?

- EPA has revised the 2000 regulatory determination that electric utilities must be regulated with MACT standard. Not legally necessary to have a MACT standard, especially given ability to regulate under section 111(d)
- Cap and trade program provides cost savings, guarantees permanent cap on emissions, allows provision of long implementation time frame as technology becomes available
- EPA analysis indicates that “hotspots” of mercury deposition will be addressed despite emissions trading

Will Allowance Trading Cause Mercury Hotspots?

- Trading promotes reductions at the sources with lowest control costs; these are typically the largest sources
- Controls will primarily reduce emissions of ionic mercury primarily, the form of mercury that most deposits locally
- EPA evaluated impact of regulations on mercury deposition in 2,150 watersheds encompassing the U.S.
  - found deepest reductions in places where utilities had the biggest impact
  - By 2020, utility mercury emissions will account for no more than 20% of deposition in any watershed

Summary Statistics for Percent Utility Attributable Mercury Deposition (aggregated to the HUC-8 level)

Statistic	2001 Base Case	2020 (with CAIR/CAMR)
Minimum	0.01%	0.01%
Maximum	55.21%	18.79%
50th percentile	2.92%	2.00%
90th percentile	21.14%	7.58%
99th percentile	39.16%	12.81%

Costs-Benefit Assessment

- Estimated costs (incremental to CAIR): $846-895 million/year
- EPA estimated neurological health benefits from reducing mercury exposure through fresh-water fish consumption
- Neurological benefits in IQ points
- Estimated benefits: $0.2 million – $3.0 million/year + unquantified potential benefits, including ocean fish mercury reductions, reductions in Western U.S. freshwater fish, cardio-vascular health benefits, particulate matter reductions

NESCAUM/Harvard Center for Risk Analysis (2/05)

- Estimated benefits of EGU mercury controls range from $75 million to $5.2 billion
- $48 million - $4.9 billion from cardiovascular benefits in adults
- $75 million - $288 million in neurological benefits from reduced fetal exposures
- Includes freshwater and saltwater fish

Differences Between EPA and NESCAUM Benefit Analyses

EPA	NESCAUM
Incremental impact of CAMR reductions beyond CAIR	**Total mercury reductions from "Clear Skies Initiative"**
Considered freshwater fish in 37 Eastern States	**Considered all U.S., Gulf of Mex., NW Atlantic, rest of world**
Did not quantify cardio-vascular health impact	**Quantified (uncertain) cardio-vascular health impact**
Benefits reduced by "lag" time between reduced emissions and reduced fish concentrations	**No lag time incorporated**
Cost/lost IQ point: $8,807 (1999)	**Cost/lost IQ point: $16,790 (2000)**
Some differences in dispersion modeling, dose response modeling. However, both include both a "no-threshold model" and a "threshold model," with the EPA reference dose as the threshold.	

IQ Impacts Per Birth Cohort of All Current (2001) U.S. Methylmercury Exposures ($ in millions)

	NESCAUM	EPA (implied)
Threshold model (IQ pts)*	187,000	85,003
$ value	$3,137	$749
No-threshold model (IQ pts)	1,185,600	250,010
$ value	$19,906	$2,202

* Using upper bound of range of estimates of IQ impact from EPA threshold model.

Percentage of IQ Lost from Methylmercury Exposure Regained as a Result of Utility Emissions Reductions (using threshold models)

NESCAUM 1 (19.1 ton emissions reduction)	2.6%
NESCAUM 2 (26.7 ton emissions reduction)	4.2%
CAMR vs CAIR* (9.4 ton additional reduction)	**0.7%**
CAIR vs 2001* (14.2 ton emissions reduction)	8.6%

* Using upper bound of range of estimates of IQ impact from EPA threshold model.

Changes from Baseline Mercury Deposition Within U.S

NESCAUM, Scenario 1	
Northeast	3.00%
Mid Atlantic	9.00%
Southeast	3.00%
Midwest	3.00%
West	1.00%
EPA--CAMR vs CAIR (mean watershed)	**1.02%**
(90th percentile utility impact watershed)	**0.46%**
EPA--CAIR vs 2001 (mean watershed)	8.30%
(90th percentile utility impact watershed)	12.18%

Conclusions

- Importance of understanding cardiovascular impacts
- With respect to neurological impacts, primary difference between EPA and NESCAUM studies is the reduction scenario under consideration
- Neither EPA nor NESCAUM have considered health benefits from U.S. reductions on Canada or elsewhere outside U.S.
- Importance of understanding impact of deposition on seafood, in order to understand global benefits of mercury emissions reduction